

Handwritten: From Sus Kato

Handwritten: - Trip to Japan

NARRATIVE REPORT - Trip to Japan

June 27, 1972. Left San Francisco airport at 1000; arrived at Haneda airport at 1630, June 28.

June 29. Went to the Tsukiji central wholesale fish market at 0600 with Dr. Tokiharu Abe of Tokai Fisheries Research Laboratory. Besides being one of the foremost ichthyologists in Japan, Dr. Abe is also an authority on the complex machinery of the Tsukiji fish market. Much of the notes below regarding species, prices, etc., were gained through his knowledge, or through his many acquaintances in the market.

About 150 species of vertebrate and invertebrate marine animals are sold daily at the central fish market. During the course of a year, about 600 species can be found here. Marine products are sold by auction, by 11 wholesalers, who usually handle seafood items on consignment. About 1,300 secondary wholesalers, or "middlemen" purchase at auction and in turn sell to retailers and restaurants. Most of the middlemen have stalls in the central market.

We were too late to observe the auction for sea urchin roe (uni), which starts at 0520, but talked with Mr. Oya of Chuo Gyorui, the largest wholesaler of uni. This company auctions off 6,00 - 35,000 trays of uni daily (1200-7,000 kg). According to Mr. Oya, the best roe are about 5 cm in length and yellow in color. Korean uni looks similar to Japanese uni, but is inferior in taste, and the net weight is usually less than the standard 200 gm/tray, thus the price is always lower. (I was to learn later that the criteria for "quality" of uni differs considerably depending on the locality; each locality in Japan claims to have the "best" uni.).

Later in the morning, I went to the American Embassy to check with our Fishery Attache, Clint Atkinson, and his assistant Mr. Yoshio Nasaka. They arranged to have the seafood items I had shipped earlier held at a cold storage plant at the central fish market. Clint provided me with boots, which are indispensable at the fish market, and a card giving me Post Exchange privileges. The latter was extremely valuable, for with it I was able to have wrapped and shipped, at a modest cost, the many publications and samples that I acquired.

During lunch at the Sanno Hotel (where the PX facilities are located) with Clint, Mr. Nasaka, and Dr. Tomonari Matsushita and Mr. Ichiro Yasaki of the Japanese Fisheries Agency, we discussed the objectives of my trip and I learned some details of import and marketing practices in Japan.

Later I met with an old friend, Dr. Reizo Ishiyama of Tokyo College of Fisheries. He had taught at Shimonoseki College of Fisheries for many years and made arrangements for me to visit with fisheries researchers there and to tour a sea-urchin processing plant in Shimonoseki.

June 30. Went to the fish market at 0430 in order to observe pre-auction activities concerning uni. The auction normally starts at 0520. Several thousand trays of roe, most of which had been air-shipped from Hokkaido, were laid out for inspection. Some uni were from northern Honshu (the central main island) and south Korea. Over a hundred buyers were examining the uni, to check for freshness, leakage of fluids, color, size, texture, and weight. Apparently it was assumed that the Korean uni was inferior, for it always brought a low price; as far as I could tell, the size and color were similar to Japanese uni.

At least three, and possibly four wholesale companies hold auction sales. The better quality uni was put on the block first. The price range this day was about 350-1,100 yen per tray of 200 gm., or about \$2.60-\$8.18/lb. Most of the uni measured 2.5-3 cm. long and 1.2-1.5 cm wide. These were laid in wooden trays with inside dimensions of 8.9 cm width, 16.5 cm length, and 1.3 cm high (roughly, 3 1/2" x 6 1/2" x 1/2"). The trays were stacked 13 high.

Later, I distributed samples of seafood from our west coast to five firms that had expressed interest. I had frozen uni, squid, whelk (Kelletia), abalone trimmings and guts, geoduck clams, and butter clam; the last two were from Arne Einmo of NMFS Market Service in Seattle.

Later, I went to Tokyo College of Fisheries, where Dr. Ishiyama and several of his acquaintances interested in importing uni were waiting to see a sample and to discuss details of processing and shipping methods. Because of market resistance to new products, it was decided that fresh uni, packed and processed in the traditional way, stood the best chance of gaining acceptance. We thus decided to send a trial shipment in trays supplied by the firm, Prawn Development Co., Ltd., to test the feasibility of shipping fresh California uni by air.

July 1. In the morning, I went to the fish market to take photographs of the wholesale fish stalls.

At 0930 I boarded the express train and arrived at Shizuoka at 1115. Susumu Kume of the Far Seas Fisheries Research Laboratory met me at the station and escorted me to the laboratory where I met the Director, Dr. Osamu Kibesaki and several members of his staff. Most of the afternoon was spent with Kume and Dr. Akira Suda, discussing my itinerary and making arrangements for contacts in the several cities I planned to visit.

July 2. After a tour of the laboratory building and grounds and a few hectic games of table tennis in 96° heat, I returned to Tokyo. This time the train was extremely crowded due to the weekend rush.

July 3. After a couple hours of wandering and taking notes at the fish market, I distributed more samples of seafood to three firms. Then I went to the Tokai Regional Fisheries Research Laboratory to meet with Dr. Katsutoshi Miwa, an expert on the biochemistry and processing of sea urchin roe. I learned about the various processing methods being used in Japan for preparing uni for the fresh market as well as for bottled products. According to Dr. Miwa, the Canadian sea urchin which is the same as our California species, has not been received well, because of the large size of the roe and lack of freshness. Apparently, the Nikko Shokushi Co. (a subsidiary of Japan Air Lines) which owns the Canadian sea urchin processing plant, imports whole sea urchins by air, and prepares them for marketing in Japan. (Previously, only the cleaned roe was being shipped from Canada.). Average prices in summer for Canadian uni was 300-500 yen/tray (\$2.23-\$2.97/lb.) and in winter from 700 to 800 yen/tray (\$4.16-\$4.76/lb.). Because of the low summer prices, the Canadian fishery has been suspended until fall. (I learned later that Mexico has also been exporting fresh uni to Japan, and that fishery too had been suspended until fall.).

According to Dr. Miwa, the "best" color of roe is red and the best size 3-4 cm. My notes may be wrong here; he might have meant "aka uni" or "red sea urchin" rather than red-colored roe.

He also noted that consumption of fresh uni is rather steady at about 100 tons per month. (Note: catch statistics do not confirm this observations). If one sea urchin yields about 20 gms of roe, this represents a monthly catch of 5 million sea urchins. Because urchins are scarce, many fisheries are limited to a season of a few weeks each year, and projects are underway in several areas to enhance the environment for sea urchins. I wonder if Californians would feel the same after a fishery has been established; it is conceivable that even though considered a pest now by abalone fishermen, and the kelp industry, our urchins may one day prove more valuable than abalones and kelp.

Salted uni brings about \$3.00/lb., but can range upward or downward remarkably, depending on quality (i.e., color, consistency, flavor). The price is low, when one considers the dehydration. At 15 percent salt, the roe is saturated; 30 percent by weight of salt is used to insure saturation.

Dr. Miwa reported on some experiments he conducted on freezing the roe. He found that by drying the roe well before freezing, and storing at a temperature of  $-30^{\circ}$  C, the uni retained its fresh character for at least 30 days. One Japanese firm apparently intends to store uni in this manner this year for sale during winter. Fresh uni has a shelf life of 5 days at  $0^{\circ}$  C and 3 days at  $3^{\circ}$  C if "myoban" (alum) is used. I also learned from Dr. Miwa that sea urchin roe is considered a "perfect" food, containing much protein and fat, and many essential vitamins.

After conferring with Dr. Miwa, I went over some statistics of sea urchin and other seafood products with Dr. Abe.

July 4. At 1100, I checked out of the hotel and caught a cab to the Akihabara train station, where I met Mr. Kazuhiro Hirabayashi of Inui Yakuhin Kogyo Co., which acts as a broker for the Kishimoto Special Liver Oil Co. The latter firm imports liver oil from certain species of sharks, distills it to obtain the squalene fraction, and hydrogenates the squalene to form squalene, a colorless, odorless oil. This final product is used by leading cosmetic firms in facial creams and medicants. Although many sharks of the family Squalidae contain a high fraction of squalene in their livers, the basking shark (Cetorhinus maximus) is by far the best source of this oil because of its immense size. Each adult shark has over a thousand lbs of liver or about 850 lbs of oil; the squalene fraction amounts to about 50 percent of the oil. Recently, the production of basking shark oil in Norway, the largest producer, has dwindled and the Japanese are anxious to find other sources of oil. Knowing all this prior to my visit (I had started a California fishery in 1968), my main purpose here was to learn about the total utilization of basking sharks; the California fishermen take the livers and discard the carcasses.

Mr. Hirabayashi and I caught the 1325 express train and arrived in Choshi city at 1525. After checking in at a hotel, we went to Mr. Kishimoto's plant, where we had a long discussion about the prospects of reviving our basking shark fishery in California. Later we visited the fish market where tons of skipjack were being loaded on trucks to be delivered to the Tokyo Central Fish Market early next morning. Because of closed season, the entire trawling fleet was tied up. For an ichthyologist, this port is one of the most interesting, because a variety of groundfishes, pelagic fishes, and deep water species can usually be found here.

July 5. After an early morning visit to the fish market, I toured the Kishimoto plant, where I found hundreds of barrels of shark liver oil, principally from Spain and Taiwan. Later Mr. Sogo Takatsu of Onahama joined us. He is a shark and sea urchin processor among other things. From him I learned that each processed basking shark was worth \$500-\$600 for the liver, flesh, fins, and cartilage. The hide is the only part not

being used in Japan. The fibers of the fin rays are extracted and dried, and the flesh is sold fresh and frozen. The cartilage is dried and sent to Seikagaku Kogyo Co., located near Tokyo, where it is used in the manufacture of chondroitin sulfate, which is believed to be effective for curing ailments of the liver, impotency attendant with old age, rheumatic diseases, and after-birth problems. Because of a shortage of cartilage from sharks and whales, Seikagaku Kogyo is now importing shark cartilage from Singapore and is trying to collect the cartilage of all the sharks taken in Japan. Unfortunately, most of the sharks landed are headed, so that the chondrocranium, the part from which the most chondroitin sulfate can be extracted, is discarded at sea. The firm pays about \$0.40/lb for good quality dried cartilage.

Another curious use for basking shark chondrocrania is as a substitute for jellyfish, which is a popular Japanese dish. Apparently, it is difficult to differentiate between dried jellyfish and cartilage, both having similar crunchy consistency.

Mr. Takatsu related that three persons can dispatch a basking shark completely within two hours: the liver is stored in drums; the fins removed and saved; the hide cut off and discarded; the meat cut into large chunks and refrigerated or frozen; and the cartilage stored until later when it can be boiled and the meat removed before drying.

Mr. Takatsu described the process for making baked uni on clam shell, a product unique to northern Honshu. The roe is washed in a solution of magnesium chloride and sea water to prevent dripping. About 70 gm of roe is placed in a clam shell and baked. This product can then be frozen. Each shell sells for about \$1.00-\$1.25. Yellowish uni is best; orange uni is hidden below the top layer of yellow uni. Broken pieces can also be used. In Onahama City alone, Mr. Takatsu reports he can use about 1,000 shells/day (i.e., about 60-70 kilos of uni). The open season for sea urchins in Ibaragi and Fukushima prefectures (northern Honshu) runs from the beginning of May to July 20. Thus the supply of uni for this special product is critically short during most of the year.

Regarding basking sharks he reported that he obtains 1.2 tons of flesh from a large shark (total weight about four tons). This he sells at 80 yen/kilo (\$0.12/lb). He also gets 250 kilos of frozen cartilage, which is sold for 80 yen/kilo (\$0.12 lb) wet weight. He receives 250 yen/kilo (\$0.37/lb) for the dried product. Thus from one shark, he receives about \$380.00 for side products. The liver oil is worth well over \$200.00. In addition, one shark yields about three kilos of dried fin fibers, probably worth over \$50.00.

At least three companies are producing chondroitin sulfate, among them Taiyo Fisheries, perhaps the largest fish company in the world. Taiyo reportedly supplies about 50 percent of the market for this product.

Later in the day, we visited a shark processing plant where blue sharks (Prionace glauca) were being filleted and the meat separated from the skin mechanically. As with basking sharks, the fins and cartilage were also used, and the only waste product was the skin.

July 6. Took the 0822 express to Tokyo, arriving at 1030. At the Inui company in Tokyo, I discussed the possibility of exporting several seafood items to Japan with Mr. Hajime Kato, manager of the import section. He was interested in the possibility of importing sea urchins, butter clam, and geoduck clam from Seattle. He cautioned that we test for cadmium, mercury and PCB in all our export products.

Leaving Inui, I rushed to the airport just in time to catch my 1420 flight to Fukuoka. Upon arrival there, I caught a cab to the train station and went to Shimonoseki, where I spent the next two days.

July 7. Shimonoseki is noted in Japan as the sea urchin "capital," although knowledgeable people know that the bulk of Japanese uni comes from Hokkaido. Still, Shimonoseki produces the most processed uni in the country, thanks to a brisk import trade. Sea urchin roe is imported from Hokkaido, Taiwan, North and South Korea, Okinawa, Chile, and Russia, and indications are that some will be forthcoming from the Republic of China.

Auctions at the fish market are held at 2 AM, so I missed watching this spectacle. Most of the products are hauled to Osaka, Tokyo, and other areas. (Imported sea urchin roe does not enter the auction, but is sent directly to the processors). A secondary auction held at 6 AM, for the local wholesalers, was similar to the one at Tokyo but on a much smaller scale.

At 0930 I caught a train to Nagato, then a cab to Senzaki, to the Yamaguchi Prefectural Fisheries Research Laboratory. There I was escorted by Mr. Tatsuo Nakamura on a tour of their new facilities. The buildings were impressive, with much space given to aquaculture projects. One such project is the laboratory culture of sea urchins. The plan is to release cultured larvae into the ocean before they settle on the bottom. Other work with sea urchins dealt with monitoring the fishery and studying aspects of life history and ecology. Other animals being cultured were topshells and abalones, which commanded priority. Interestingly, in areas where abalones were introduced, sea urchins were removed first. An intriguing project was the use of "artificial kelp" made of plastic "fronds" to attract fishes for commercial harvesting. (Sport fishing groups are emerging in Japan, but still lack political power).

Mr. Nakamura then took me to Oiura Village (near Hagi City) about an hour north of Senzaki, to observe sea urchin harvesting and processing methods. Three species of urchins are used in this area. No closed season has been established by the Government, but the fishery cooperatives themselves control the times for harvesting. For two species, the season runs from June through August, by which time harvestable sizes are completely gone. The third species is taken from October through May. Two of the species are used fresh, and the third is used for bottling, having characteristics that have earned Shimonoseki its reputation of "sea urchin capital."

Prefectural regulations prohibit the use of underwater breathing apparatus so the divers, clad in rubber wet suits, bob continuously up and down in waters up to 10 meters in depth. Divers work from early in the morning to late in the afternoon. Usually, the catch is then taken to the diver's home or to a central processing area, where the relatives of the diver clean the urchins. The cleaned roe is sold at auction the next morning at 2 AM. Cleaning the roe is strictly a hand operation; here as elsewhere, no one has come up with efficient mechanical means of cleaning the delicate roe.

According to the manager of a cooperative, a diver averages about three kilos of uni per day, worth about 10,000 yen (\$33.00 or \$4.96/lb). The standard wooden tray used in Shimonoseki holds only 40-50 gm, and the wholesale price of raw uni is considerably higher than in Tekyo. For the large (about 45 mm) red sea urchin roe, the price is about \$10.00/lb. (My notes may be wrong; the diver's payment and the wholesale price appear to be considerably different.)

Later, I went to a small processing plant run by the cooperative, where a processing and packing demonstration was given for my benefit. This was entirely a hand operation. Salt was sprinkled on a table, and a few pounds of freshly cleaned uni were placed on the layer of salt. More salt was sprinkled over the uni, and the whole mass was mixed thoroughly. The uni was then placed in bottles containing a small amount of 95 percent alcohol. Then some pre-hardened salted uni was also added in each bottle. The "bafun" uni, a small species (those harvested yield 1.5-2 gm of roe each), is considered the best for bottling because it turns bright orange and quite tacky when alcohol and salt are added. With other urchins, artificial coloring and starch are often added to achieve similar qualities.

July 8. After watching the primitive methods used at the Oiura uni processing plant, it was quite a contrast to see processing operations at the Ogawa Uni Manufacturing Co., in Shimonoseki. Most of the uni used by this firm is imported from Okinawa, Taiwan, Korea, and Chile. Because of low-grade quality (off-color & thin consistency) the uni is mixed together in a blender, and salt, flavoring, starch, and artificial coloring

is added. The mixture is fed into a machine which automatically fills the bottles. A line of workers cap the bottles and machines seal and label them. A total of 60-70 workers are employed, most in the packaging section, where the bottles are wrapped and boxed. Packaging for attractive presentation of products is a vital aspect of marketing in Japan.

I talked with the owner, Mr. Ogawa and with Mr. J. Nomura at length about the uni business and learned the following:

1. This uni company is the largest in Japan, using up to 500 tons of raw and salted uni annually.
2. The price of uni used in processed products is too low for the Japanese fishery, so Ogawa uses imports. For special high-priced items, however, local uni is used.
3. The price of imported salted uni is about \$1.00/lb.
4. To prepare uni for export, 10 gm of salt and 15 gm of 95 percent alcohol are added to 100 gm of fresh uni.
5. Hardness of roe in salt and alcohol (a desirable trait) is a function of the fat content; the more fat, the softer the roe. Excess fat also causes oxidation problems.
6. An import duty of 7.5 percent is paid on salted uni.
7. In Okinawa, two divers harvest daily enough sea urchins to yield about 60 kilos of roe; four people process these in five or six hours. (Note: I find this hard to believe.)

As a result of our conversation, we concluded that we should not consider exporting salted uni from California, unless our sea urchin roe possesses the necessary characteristics of color and cohesiveness which command a high price.

Later, I talked with Dr. Masamichi Kochi of the Shimonoseki College of Fisheries, who is doing research on sea urchin biochemistry and food technology.

In the afternoon, I caught a plane to Kagoshima, located at the southern tip of Kyushu (the southernmost of the four main Japanese islands).

July 9. Sunday. Went sightseeing and visited friends.



July 10. Accompanied by Mr. Yoshiteru Beppu, Chief of the Fisheries Section of the Prefectural Government, I visited the Kagoshima Prefectural Fisheries Research Station. There we talked with the Director, Dr. Kunihiko Shigeno, who is famed for his methods of culturing shrimp. We discussed the possibility of using California squid as food for cultured shrimp, but concluded that the price was slightly too high.

From the laboratory, we went to Sakurajima Island by ferry, then drove on to Tarumizu City, where the field station of the lab is located. The principal projects being carried out were abalone and shrimp culture. As at the Senzaki lab, the facilities were new and quite impressive. Several huge circular tanks (bottom area about 400 m<sup>2</sup>) with sand bottoms held thousands of small shrimp. The tanks are stocked with 150 shrimp per square meter. Food costs are high, ranging up to 100 yen/kilo (\$0.15/lb).

Another large project was the rearing of "kotobushi," a small species of abalone. The abalone are reared to 7 mm (about 2 months) and released in the sea. After a total of 18 months after spawning, the abalone grow to 50 mm, the minimum commercial size. In the culturing tanks, the abalone are fed ulva, which does not occur in the normal habitat, to provide color checks for identification. Presently, the cost of culturing abalone is about a penny per millimeter for each abalone. The abalone are planted without cost to the fishery cooperatives who harvest them commercially, as is the case in other prefectures, but researchers here feel that the project will be made self-sustaining in the near future.

Within the past one and one-half years, about 300,000 abalones have been planted and nearly 50 percent have been returned in the commercial catch, which speaks well for the survival but discloses an alarming exploitation rate. As elsewhere, the chief difficulty is providing adequate food for the abalones, not only in the culture tanks, but also in the natural habitat. For this reason, research is being done on culturing seaweed and planting them in the ocean.

After leaving the lab, we visited a yellowtail culture cooperative located nearby at Osumi Peninsula. The fingerling yellowtail are captured under drifting seaweed and raised in floating pens for 7-8 months, by which time they have attained a weight of 1.5 kilos and are sold as "hamachi" or small yellowtail for 500-600 yen per kilo (\$0.74-\$0.89/lb.). Some are kept for two years and weigh 6 kilos. These are called "buri" and command a higher price. The annual production of this cooperative is about 3,000 tons. The total annual production of cultured yellowtail in Japan is about 50,000 tons.

Recently, researchers at Nagasaki reportedly were able to spawn yellowtail and raise them from the egg, but the cost is still higher than stocking with fingerlings.

We arrived in Kagoshima in time to greet a diving vessel returning to a secluded sea urchin cleaning station. The divers use dry suits and a primitive air compressor to gather shellfish and sea urchins. Mr. Beppu had arranged for the divers to bring back some sea urchins so they could demonstrate their cleaning methods for me. As in Oiura, simple hand tools (pick, spoon, and forceps) are used to clean the urchins. The long-spined urchins (probably a species of Diadema) are first placed in a wicker basket and agitated to remove the spines. For the first time, I observed the use of "myoban" (alum) to harden the roe to prevent leakage of fluid. The concentration used appeared to be much higher than that reported to me previously, and the solution effectively hardened the roe in five minutes. The alum was mixed with a solution of one part fresh water and three parts sea water.

According to the diver, one person can clean and pack 15 trays (40 grams per tray; total 1.3 lbs) per hour. As I watched him work, however, I found that he packed only two trays in twenty minutes. At auction, prices for this fresh product range from 250-300 yen/tray (\$9.30-\$11.16/lb.).

July 11. Caught the 8 AM plane to Tokyo after a quick look at the fish market. To this point, I had been extremely fortunate in missing the numerous rain storms which were plaguing the entire country. About 400 people in Kyushu alone had perished last week when dikes overflowed and avalanches buried many homes. I had planned to go to Aomori in northern Honshu, but because of reports of torrential rains and disrupted train service, I decided to stay in Tokyo to learn the reaction to the seafood products I had distributed.

I also had the opportunity of visiting another uni processing plant, Marukin Industrial Co., in Tokyo. This company is intermediate in size, using about 200 tons of salted urchins annually, which are imported from Mexico, Chile, and Hokkaido. For good-quality salted uni from Hokkaido, the company pays \$4.46-\$5.95/lb, C & F Tokyo; for lower quality material, the delivered price is about \$1.20/lb. A legitimate complaint against the low quality uni was the large amount of spines, pieces of shell, internal organs, and algae included with the roe. These had to be laboriously removed by hand before the uni could be processed. California uni was considered acceptable for processing, but the price will depend on the consistency and color of the final product. Incidentally, this firm is the source of the majority of bottled sea urchin roe sold in the U.S.

July 12-15. The remainder of my time was spent talking with various researchers, buyers, and government officials. Their comments and my observations are summarized below:

1. Dai Ichi Shoji Co.

- a) No interest in butter clam, geoduck clam, or Kelletia.
- b) Sea urchin roe: definitely interested in importing fresh roe if price can be met (550-1,000 yen/tray, delivered; or \$4.09-\$7.44/lb). Price depends on market conditions. Must be packed in typical Japanese trays. Would like a sample shipment.
- c) Squid: size, species, and price attractive; would like several thousand tons, but Japanese import restrictions prevent sale.

2. Taiyo Fishery Co., Ltd.

- a) Squid: six countries have export licenses to ship squid to Japan, but production from these countries is low; more squid is needed in Japan; California squid is bland in taste, the meat thin, and size too small; quota discourages talk of squid.
- b) Butter clam: can use frozen, shucked; in 2-1/2-5 lb. blocks; requests price and biological information (spawning season, etc.).
- c) Geoduck clam: good flavor; can use; request price, and sample of entire clam--not just neck--to become familiar with it.
- d) Kelletia: can use, but must be live (too expensive) or cooked and meat removed from shell.
- e) Abalone: California black abalone better than California greens.
- f) Abalone intestines: need to remove stomach or remove sand; still haven't made evaluation of my sample; if good, will pay about \$0.90/lb f.o.b. California for cooked, frozen intestines.
- g) Wavy top shell (Astraea): want to see sample of meat.
- h) Sea urchin roe: frozen sample tastes fine; yellow best, orange too fat, thus must be used in bottled products (Note: I learned elsewhere that fat is not desirable for processed uni); the smaller the granules, the better the quality; should be thoroughly dried before freezing; no commitments.
- i) Carp eggs; will let me know if their fresh water section is interested.
- j) Carp surimi: interested because of recent developments pushing for closer ties with Republic of China; willing to work with trial shipment of a ton.

- k) Surimi: yield is lower than fillet blocks (Note: I thought the opposite was true).

3. Nomura Trading Co., Ltd.

- a) In general, samples too small to really get market reaction.
- b) Butter clam meat: wants sample of 10 kilos.
- c) Geoduck clam: taste good; want sample of 10 kilos.
- d) Sea urchin roe; taste good, but roe too large; one customer did not like flavor; need to be "quick frozen"; to preserve color, try vitamin-C to prevent oxidation.
- e) Abalone trimmings: interested, will pursue.
- f) Kelletia: interested if boiled and meat removed; comparable items sell for about \$0.60/lb in Japan; if possible to send frozen whole Kelletia at about 160 yen/kilo (\$0.23/lb), may be feasible.  
(Note: this is a much better price than that quoted for shelled meat).
- g) Smelt: need females with eggs only (minimum 70 percent females); will pay \$480/ton f.o.b. California quick frozen in 10 lb. blocks 50 lbs master carton; want 500 T/year; bought 3,000 tons from Norway last year; in Japan males and females are distinguishable by their colors; genus Spirinchus.
- h) Abalones: bigger the better; California black abalone: meat hard color poor, parasites present; very difficult to transport live abalone; California red abalone best.
- i) Herring with roe, frozen: females only preferred, block-frozen in 10 kilo boxes; can provide plate freezers.
- j) Seaweed: import of seaweeds restricted.
- k) Sea cucumbers: wants samples of dried cucumbers.
- l) Broadbill swordfish: can use, but price must be around \$0.22/lb delivered; quick-frozen fillets, glazed.

4. Dr. Hamabe, squid expert at Tokai Regional Fisheries Research Laboratory:

The Japanese squid, Todarodes pacificus, has a complex population structure. It has three principal spawning season, spring, summer, and fall. Each group constitutes a subpopulation, but no differences have been found in the squid's morphometrics. All squid die after spawning, after a one year life cycle. Tagging studies have successfully showed paths of migration of all three spawning stocks. Of 300,000 tags, the recovery rate has been 2-3 percent, all tags being returned within a year after tagging. The growth rates of the three spawning groups appear to be the same. To age squid, maximum size attained and modal size groups in the catch are used. No one has developed physical means of determining the age of the squid.

5. Ryoshin Trading Co., Ltd.

- a) Squid: too small, but price is good; price of squid in Japan low at present because of good domestic catch; other less productive years better for importing squid; frozen squid should be dark, not bleached. (Note: not so, according to other interested buyers).
- b) Butter clam; whelk: not interested.
- c) Sea urchin roe: frozen uni not suitable for raw consumption; size is fine, however. (Note: these comments are completely opposite of comments by others); California urchins fine for salted products.
- d) Geoduck clam: interested; request price.
- f) Sergestes: interested; want sample, boiled in salt water and dried.

6. Nichimen Co.

- a) Interested in importing live eels (150-200 gm each) and live eel larva (7-8 cm each, about 5,000 per kilo); price for adult \$2.00/lb; for larvae, \$9.00/lb C & F Tokyo; larvae should be delivered between January and June; thus far this year, France has exported about 70 tons of larvae.
- b) Dungeness crab: interested in importing live individuals.
- c) Sea urchin roe: want to import salted roe, minimum of 50 tons; 100 tons/yr., preferable. (Note: price may be a problem).

7. Inuiu Yakuhin Kogyo Kaisha

- a) Butter clam meat: taste too "light"; shape of clam not retained; possibly can use smoked or dried; request price.
- b) Geoduck clam: interested; request price.

8. K. Ishiwata & Co., Ltd.

- a) Basking shark: only about distal third of pectoral have fibers; dorsal, lower caudal and pelvics all contain fibers; price of dried fins is \$2.00/kilo, C & F Tokyo (\$0.90/lb), but can be made higher; from each basking shark about 5 kilos of dried fin fibers can be obtained. Moisture content should not exceed 18 percent.
- b) Other sharks: lower caudal and dorsal fin of mako shark have fibers; blue shark fins are sold in sets of 60 kilos, at a price of \$0.98/lb; this includes the upper tail of the shark; chondrocranium and fin cartilage (not vertebrae) sold to Seikagaku Kogyo at 130-150 yen/kilo (\$0.21/lb); annual sale of cartilage amount to 140-150 tons (about \$68,000).
- c) More shark fin fibers are used in Japan, in Chinese restaurants, than in Hongkong. Because of scarcity of fins, price is higher in Hongkong than in Japan. During periods of high prices, Japanese export fins to Hongkong.
- d) Cartilage of skates and rays are also good for extracting chondroitin sulfate.
- e) Scraps of meat from sharks are used as fertilizer for orange trees; in the U.S., sheep blood is used, according to Mr. Ishikawa, who sells 120-150 tons of dried scraps annually, at 55 yen/kilo (\$0.08/lb; about \$24,000 total).

9. Nakajima Co.

- a) Squid: wants to import trial shipment 10 tons with intention of distributing to supermarkets; squid small, but taste and price good; shipping cost for frozen freight, by container, \$125.50/metric ton; some south Korean squid is available in the market.
- b) Sea urchin roe: will receive shipment of 670 kgm of frozen uni packed in plastic trays, in July or August. (Note: I had arranged for this shipment earlier in the year.).

10. Karima and Company (brokers)

"Interested" in all products samples, but buyers noncommittal.

11. Dr. Tadasu Yamamoto, Fishery Consultant

- a) Bluefin tuna: interested in obtaining belly portions from U.S. east coast; necessary to keep good color for 30-40 hours (i.e., sharp freeze or very freshly caught).
- b) Eel larvae: to catch, use lights to attract and net made with nylon hose webbing.
- c) Sergestes: want sample, boiled and sun-dried, or frozen; check for PCB content.
- d) Sea urchin roe: to ship by air, rubber shock cord used, cartons are kept hanging to avoid shock; in regular trays, 200 gm of roe is included, in "kohako" (small tray), only 80 gm.
- e) Squid: Japan harvests about 10,000 T/yr. off our east coast; squid graded into five size groups, largest (over 31 cm mantle length) bring price of \$850/ton in Spain; those under 15 cm cheapest.

12. Mr. Shojiro Shimura, Director, Guidance Division of Federation of Japan Fisheries Cooperative Association.

Automatic pole and line fishing apparatus: Japanese manufacturers are hesitant about exporting these machines because of servicing problems; apparently, the machines need to be serviced frequently.

13. Dr. Tokiharu Abe, Tokai Regional Fisheries Research Laboratory:

- a) Sergestes ("sakura-ebi") is produced only in one locality in Japan at Yui City, Shizuoka prefecture.
- b) In Iwate prefecture, sea urchin roe is canned; the product is expensive.
- c) Hagfish is used in some fishing villages for consumption; expensive.
- d) Croakers, if frozen are used in fishcakes, and are worth about \$0.37/lb; if fresh, worth more, used for sashimi.

- e) Sardine scales are needed by makers of "pearl essence"; possibly alternate species may be alright.
- f) "Surimi" (minced fish flesh): when Alaskan pollack production becomes low, Japanese will probably use New Zealand cod; now experimenting with "barracouta" from New Zealand.



Average Wholesale Prices for Sea Urchin Roe, Tsukiji

CENTRAL FISH MARKET, 1971.\*

	<u>Average Price Per Pound</u>	<u>Pounds Sold</u>
Jan.	\$4.32	121,000
Feb.	4.70	120,000
March	4.40	154,000
April	3.32	173,000
May	3.06	165,000
June	2.38	250,000
July	2.47	271,000
Aug.	2.45	271,000
Sept.	4.65	111,000
Oct.	4.62	113,000
Nov.	4.26	125,000
Dec.	4.75	184,000
	<hr/>	<hr/>
	Average: 3.52	Total: 2,018,000
		Average: 168,000/month

\*Obtained through American Embassy, Tokyo.

AVERAGE WHOLESALE PRICE OF SOME SEAFOOD AT TSUKIJI CENTRAL  
WHOLESALE FISH MARKET, JANUARY, 1972

(price per pound converted at rate of 300 yen = \$1.00)

Surume-ika (squid, Todarodes pacificus): \$0.49/lb

Yari-ika (squid, Loligo sp.): \$0.47/lb

Hi-ika (squid, small): \$0.25/lb

Sea urchin roe: \$6.20/lb

Salted sea urchin roe: \$1.59/lb

Sea cucumber: \$0.20/lb

Live abalone, large including shell weight: \$2.72/lb

Live abalone, small ("tokobushi"), including shell weight: \$2.89/lb

Anchovy: \$0.12/lb

WHOLESALE PRICES OF SOME MISCELLANEOUS ITEMS AT TSUKIJI FISH MARKET

July, 1972

Sergestes, fresh: \$0.60/lb

Abalones, about 6-inch, whole, alive: about \$3.30 each.

Sea urchin roe, fresh: range \$2.60 to \$8.18/lb